U.S. Department of Energy Requests Public Comments on the Proposed Cleanup of Contaminated Soil at the Building 850 Firing Table, Lawrence Livermore National Laboratory Site 300

LLNL-AR-401255

United States Department of Energy - Livermore Site Office • February 2008

The U.S. Department of Energy (DOE) is requesting comments on a proposed removal action to clean up soil contamination at the Building 850 Firing Table located at Lawrence Livermore National Laboratory (LLNL) Site 300. DOE is the lead agency responsible for cleaning up soil contamination at LLNL Site 300.

The U.S. Environmental Protection Agency (EPA), the California Department of Toxic Substances Control (DTSC), and the California Regional Water Quality Control Board (RWQCB) provided oversight and guidance in the investigation of contamination at Building 850, and the evaluation of the removal actions to address this contamination.

How to Submit Comments on DOE's Proposed Remedy
Mark Your Calendars – Dates to Remember

Public Comment Period
Begins February 20 and ends on March 20, 2008

Written comments may be submitted to DOE during the public comment period by mail or at the public workshop (see below). Written comments should be mailed to the DOE Site 300 Remedial Project Manager and must be postmarked no later than March 20, 2008. A comment sheet with DOE's mailing address is provided for your convenience on Page 8.

Public Workshop
March 6, 2008

DOE will hold a public workshop to explain the proposed removal action. The workshop will be held on Thursday March 6, 2008, from 6:00 to 8:00 p.m. at the Tracy Community Center, located at 300 East 10th Street, Tracy, CA. Written comments will be accepted at the workshop.

For more information about the proposed cleanup of contaminated soil at the Building 850 Firing Table, key documents are available at the following locations:

LLNL Discovery Center
East Gate Drive off Greenville Road
Livermore, CA 94551
(Open 1-4 Tues.-Fri, 10-2 Sat.)

Tracy Public Library
20 East Eaton Avenue
Tracy, CA 95377
(Open 10-8 Mon.-Thurs, 10-5 Sat., 12-5 Sun.)

Documents are also available online at the LLNL Environmental Community Relations website:
http://www-envirinfo.llnl.gov/

Site Background

LLNL Site 300 is a restricted-access DOE experimental test facility used in the research, development, and testing of high explosive materials. Site 300 covers 11 square miles and is located in the Altamont Hills approximately 17 miles east of Livermore and 8.5 miles southwest of downtown Tracy (Figure 1).

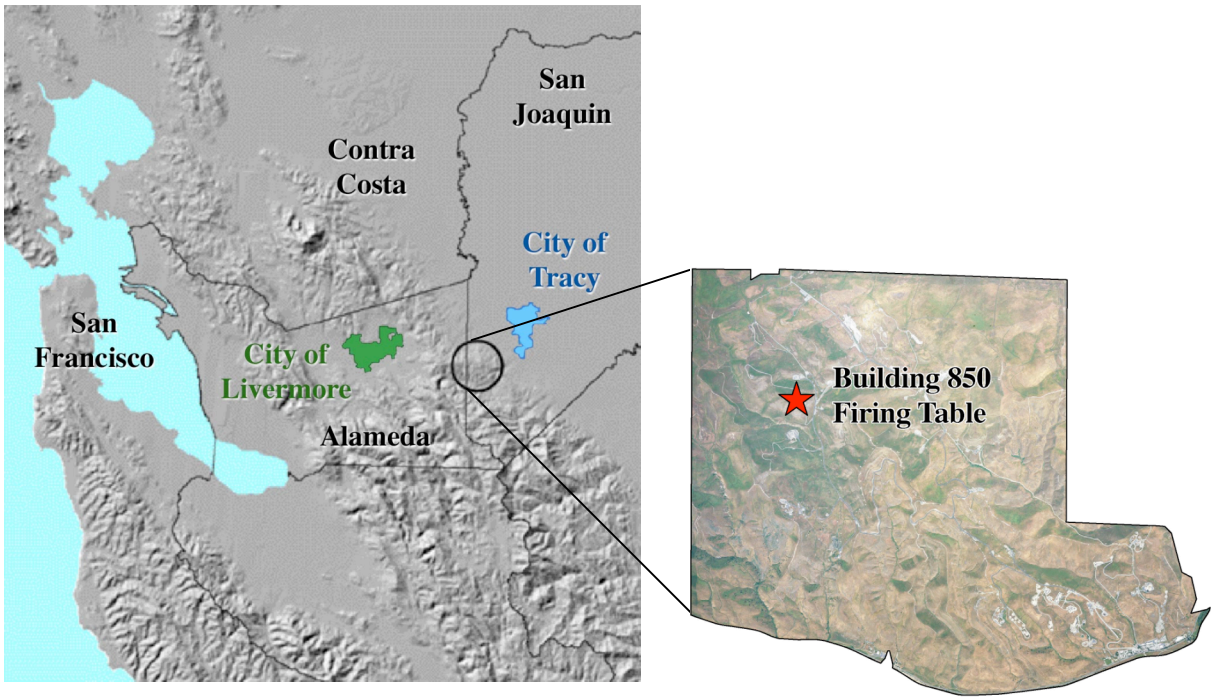

Figure 1. Location of LLNL Site 300 and the Building 850 Firing Table.

The Building 850 Firing Table is located in the northwest part of Site 300 (Figure 1). The firing table was constructed in 1960 and was used to conduct explosives experiments until January 2008 (Figure 2). Prior to polychlorinated biphenyls (PCBs) becoming regulated substances, an estimated 1,000 capacitors were destroyed on the Building 850 Firing Table, resulting in PCB-, dioxin-, and furan-contamination of the surrounding soil.

DOE conducted investigations to determine the extent of contamination, and a risk assessment to evaluate potential adverse human health effects and impacts to plants and animals that could result from exposure to these soil contaminants. The *baseline risk assessment* identified a risk to onsite workers who could inhale, ingest, or contact PCBs, dioxins, or furans in surface soil in the vicinity of the firing table. It also identified a hazard to animals that could be exposed to this soil contamination. The contaminated soil at Building 850 is located over a mile from the nearest Site 300 boundary, therefore, there is no public health hazard to residents near the site.

[a] Definition or description of italicized words are provided in the Glossary on page 8.

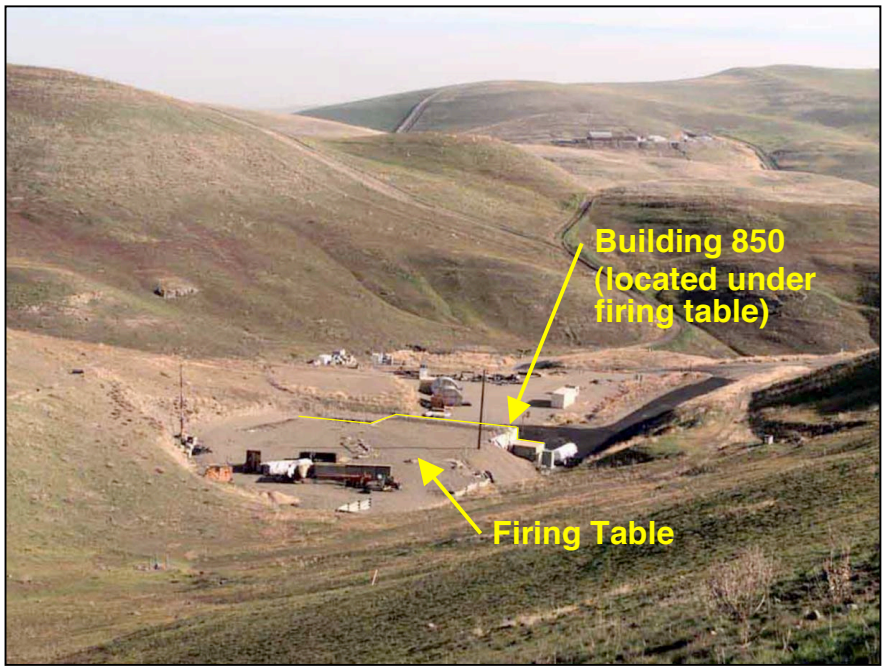

Figure 2. Building 850 and Firing Table.

In 2006, DOE, the U.S. EPA, DTSC, and the RWQCB agreed to conduct cleanup of PCB-, dioxin-, and furan-contaminated soil at the Building 850 Firing Table as a Non-Time Critical Removal Action (hereafter referred to as "removal action") under the *Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)*. The specific goals for this removal action are to mitigate risk to onsite workers and the hazard to animals associated with the PCB-, dioxin-, and furan-contaminated soil. Ground water and surface water have not been impacted by these contaminants, and therefore, these environmental media are not included in this removal action.

As part of the removal action process, DOE prepared an Engineering Evaluation/Cost Analysis to evaluate several potential removal action alternatives that could be implemented to address contaminated soil at Building 850. The regulatory agencies reviewed and commented on the removal action alternatives presented in the Building 850 Engineering Evaluation/Cost Analysis prepared by DOE, and participated in the identification of a preferred removal action.

This Fact Sheet summarizes the cleanup removal action alternatives evaluated, DOE's preferred removal action alternative, and the rationale for identifying this preferred removal action.

What are the Soil Cleanup Standards?

The U.S. EPA Region 9 industrial soil *Preliminary Remediation Goals* of 0.74 milligrams per kilogram (mg/kg), for PCBs, and 1.6 x 10^{-5} mg/kg for dioxins, and furans were selected as the cleanup standards for contaminated surface soil at Building 850 in the Interim Site-Wide Record of Decision. The Preliminary Remediation Goals for protection of human health are sufficiently low to reduce the hazard to animals to safe levels.

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What Removal Action Alternatives Were Evaluated?

In developing the proposed removal action, DOE considered and evaluated the following three alternatives to address soil contamination at Building 850:

Alternative 1: No Further Action.

Alternative 1, "No Further Action" includes no remediation and is presented as a baseline for comparison with other removal action alternatives only. There is no cost associated with the No Further Action alternative.

Alternative 2: Excavation and offsite disposal of soil.

Under Alternative 2, approximately 16,000 cubic yards of contaminated soil with concentrations exceeding cleanup standards would be excavated, and transported to a permitted offsite disposal facility. Figure 3 shows the area of soil to be excavated under Alternative 2. Following excavation, samples of the remaining soil would be collected and analyzed to confirm that the PCB, dioxin, and furan concentrations in the remaining soil meet the cleanup standards. Alternative 2 is estimated to cost $8.5 million.

Alternative 3: Excavation and onsite soil solidification and consolidation.

Under Alternative 3, approximately 16,000 cubic yards of contaminated soil with concentrations exceeding cleanup standards would be excavated (Figure 3). The soil would be treated onsite using a solidification technology that binds the contaminated soil particles into a concrete-like material to prevent exposure to onsite workers and ecological receptors. The solidified soil would be consolidated onsite, with an inspection and maintenance program to ensure the long-term integrity of the remedy. Following excavation, samples of the remaining soil would be collected and analyzed to confirm that the PCB, dioxin, and furan concentrations in the remaining soil meet the cleanup standards. Alternative 3 is estimated to cost $2 million.

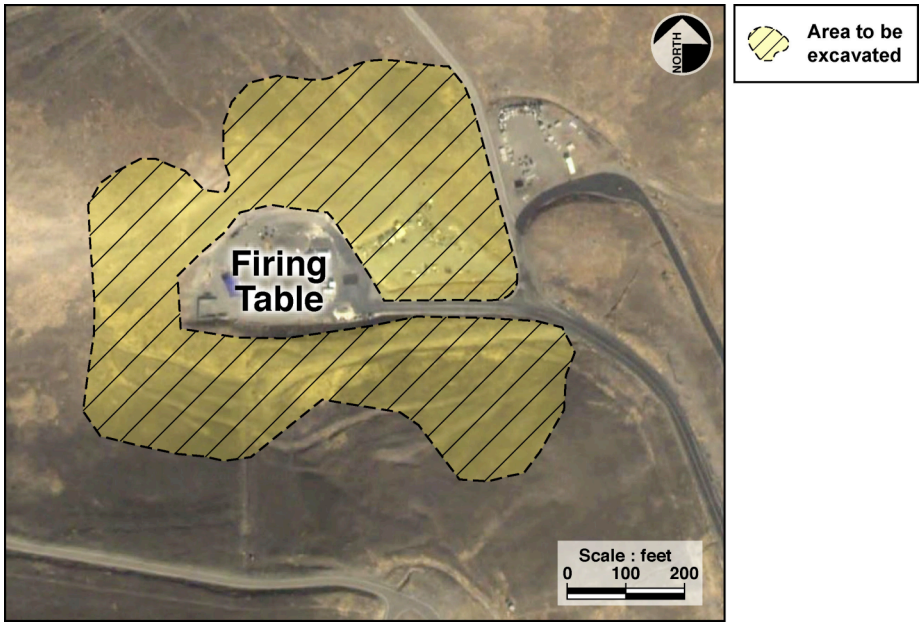

Figure 3. Area of contaminated soil to be excavated under Alternatives 2 and 3 (shown in yellow).

Evaluation of Removal Action Alternatives

The three removal action alternatives were compared against EPA's evaluation criteria of: (1) protection of human health and the environment, (2) compliance with *applicable or relevant and appropriate requirements (ARARs)*, (3) long-term effectiveness and permanence, (4) reduction in toxicity, mobility, and volume through treatment, (5) short-term effectiveness, (6) implementability, (7) cost, and (8) state acceptance. Community acceptance will be evaluated based on comments received during the public comment period. These evaluation criteria are described in Figure 4.

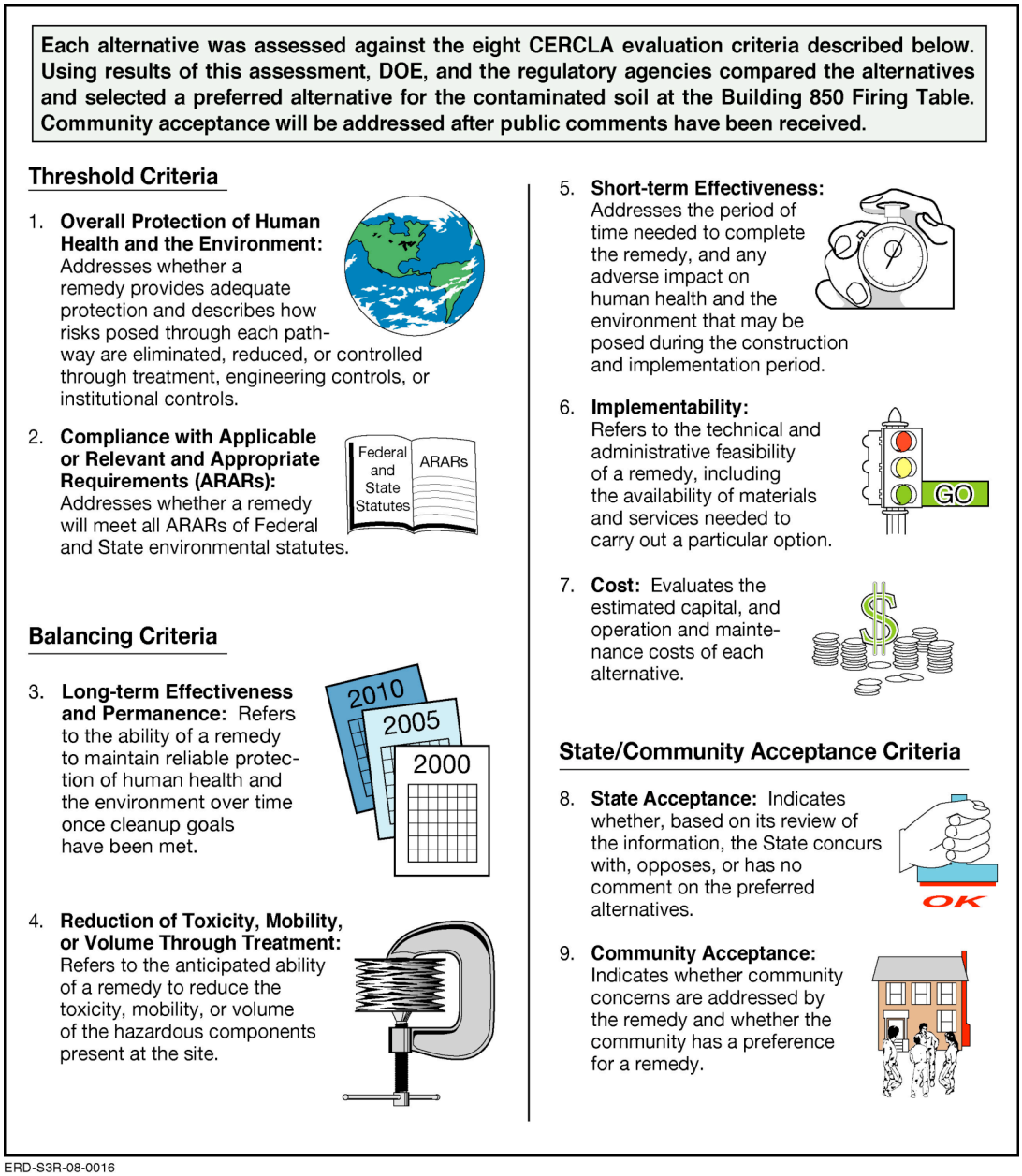

Figure 4. Descriptions of the EPA evaluation criteria.

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Alternative 1 (no further action) would not protect human health and the environment or meet applicable or relevant and appropriate requirements because the risks posed by direct contact with or inhalation/ingestion of PCBs, dioxins, and furans in Building 850 soil would remain.

While both Alternative 2 (excavation and offsite disposal) and Alternative 3 (excavation and onsite treatment using solidification) are equally protective of human health and the environment, meet ARARs, effective, and implementable, Alternative 2 is four times as expensive as Alternative 3 due to the high cost of offsite disposal of the soil.

What is the Preferred Soil Removal Action?

Based on the evaluation described above, DOE proposes Alternative 3, soil excavation, solidification, and consolidation, as the preferred removal action to eliminate the risk to onsite workers and animals from exposure to soil contamination at the Building 850 Firing Table.

The soil solidification and consolidation technology has been successfully used to clean up contaminated soil containing PCBs and other hazardous wastes at 173 sites across the country. EPA considers soil solidification as a Best Demonstrated Available Technology for over 50 types of hazardous waste.

The preferred removal action, Alternative 3, is expected to be protective of human health and the environment upon completion because: (1) the solidification treatment of the soil will prevent humans and animals from being exposed to PCBs, dioxins, or furans, (2) PCBs, dioxins, or furans have not impacted ground water or surface water, and (3) institutional/land use controls are in place to prevent exposure to contaminated media until remediation is complete.

How the Soil Excavation, Solidification, and Consolidation Process Works

1. Excavation

The first step of this process is to remove (excavate) the contaminated soil surrounding the firing table until PCB, dioxin, and furan concentrations in the remaining soil meet cleanup standards.

Soil excavation

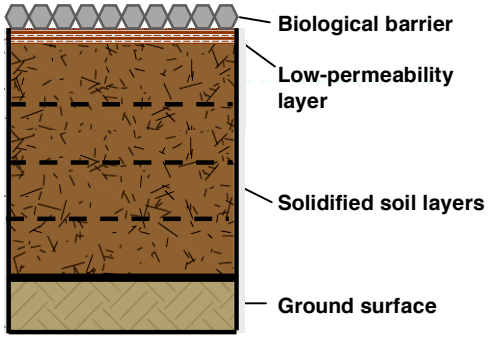
2. Solidification Treatment

The excavated soil is then combined with solidification agents such as cement, fly ash, and lime in a mechanical mixer called a pug mill. When water is added to this mixture, the cement, fly ash, and lime bind the contaminated soil particles into a concrete-like material. Once the contaminated soil is solidified, workers and animals can no longer inhale, ingest, or contact the contaminated soil, thereby eliminating the risk.

Soil mixing in a pug mill

3. Consolidation

While the soil, cement, fly ash, lime, and water mixture is still wet, it is laid down in layers at a central onsite consolidation location, such as at a former equipment storage yard adjacent to Building 850. The solidified soil with the highest contaminant concentrations would be placed at the bottom. Once the uppermost solidified layer is placed, a low-permeability layer (e.g., clay) is placed on top of the solidified soil to protect it against erosion and infiltrating rain water. Finally, a protective layer (e.g., cobbles) is installed to act as a biological barrier to burrowing animals.



Conceptualized cross section of a solidified/consolidated soil unit

4. Maintenance

The soil consolidation unit would be inspected regularly, and maintenance and repairs conducted as necessary to protect its integrity. Institutional and land use controls would be used to prevent construction work and other ground-breaking activities from disturbing the solidified soil.

What Happens Next?

DOE, EPA, and the State regulatory agencies will review and consider public comments on the preferred and other removal action alternatives, and select a final removal action for contaminated soil at Building 850 that will be documented in an Action Memorandum. The Action Memorandum will contain a Public Responsiveness Summary that will address comments received from the public during the comment period.

Following construction, the remedy is periodically evaluated to make sure it remains protective. There are several ways in which the removal action is reviewed for effectiveness and protectiveness:

- Five-Year Reviews.
- Semi-annual Compliance Monitoring Reports.
- Monthly meetings with regulatory agencies.

A Contingency Plan is also in place so that a remedy can be changed if it is not working as expected. In accordance with CERCLA, if technical evidence indicates that the implemented remedy is not effective, appropriate changes would be proposed.

Who do I contact for more information?

Regulatory Agencies:

Kathy Setian
Remedial Project Manager
United States Environmental Protection Agency Region IX
Federal Facilities Cleanup Branch
SFD 8-1
75 Hawthorne Street
San Francisco, CA 94105-3901
(415) 972-3180

Jacinto Soto
Remedial Project Manager
Department of Toxic Substance Control
Northern California Coastal Cleanup Operations Branch
700 Heinz Avenue, Suite 200
Berkeley, CA 94710-2721
(510) 540-3842

Susan Timm
Remedial Project Manager
California Regional Water Quality Control Board
Central Valley Region
11020 Sun Center Drive, #200
Rancho Cordova, CA 95670-6114
(916) 464-4657

U.S. Department of Energy:
Claire Holtzapple
Site 300 Remedial Project Manager
DOE/NNSA Livermore Site Office
P.O. Box 808, L-293
Lawrence Livermore National Laboratory
Livermore, CA 94551
(925) 422-0670 or claire.holtzapple@oak.doe.gov

Glossary

Applicable or relevant and appropriate requirements (ARARs): CERCLA requires compliance with certain Federal or more stringent State requirements known as ARARs. When a requirement addresses circumstances identical to those at a Superfund site, it is considered applicable. When a requirement is sufficiently similar, it is considered relevant and appropriate.

Risk assessment: An evaluation of the risk that would be posed to human health and/or the environment by exposure to contaminants at a site if no cleanup activities were performed.

CERCLA: The Comprehensive Environmental Response, Compensation, and Liability Act is a law that authorizes the Federal government to respond directly to releases of hazardous substances that may endanger public health or the environment.

Institutional/Land Use Controls: Structural or legal mechanisms that protect property users and the public from existing site contamination. These controls are necessary where restricted uses are chosen for a site.

Preliminary Remediation Goals: EPA risk-based guidelines for evaluating and cleaning up contaminated sites.

Record of Decision: A legal document that is signed by the site's responsible party (DOE), the U.S. EPA, and the State regulatory agencies that provides the actions for cleaning up a CERCLA Superfund site.

This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract CE-AC52-07NA27344.

PUBLIC COMMENT SHEET
for the
Proposed Cleanup of Contaminated Soil at the Building 850 Firing Table, Lawrence Livermore National Laboratory Site 300

Use this space to write your comments

Your input on the proposed cleanup alternative for contaminated soil at the Building 850 Firing Table at LLNL Site 300 is important to helping DOE select a removal action. You may use the space below to write your comments, then fold, staple, stamp, and mail. Additional comments may be included with this form.

NAME: _____

ADDRESS: _____

PHONE #: _____

I would like to continue to receive information regarding the environmental cleanup at LLNL Site 300 (please place check by your response below):

_____ Yes _____ No

REMOVAL ACTION AT BUILDING 850, LLNL SITE 300
PUBLIC COMMENT SHEET

- -

Fold on dashed lines, staple, stamp, and mail

- -

Name _____
Address _____
City _____
Zip Code _____

Place stamp here

Claire Holtzapple
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Livermore, CA 94551